

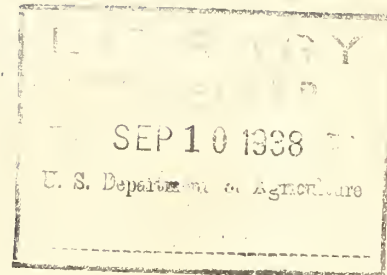
## **Historic, Archive Document**

Do not assume content reflects current scientific knowledge, policies, or practices.



1.9  
B527  
Bi-1515  
8-38

United States Department of Agriculture  
Bureau of Biological Survey



-----  
OUTLINE OF PROCEDURE FOR RECORDING DATA  
OBTAINED IN STOMACH EXAMINATIONS

Prepared in the Section of Food Habits, Division of Wildlife Research

-----

Contents

|                               | Page : |                                    | Page |
|-------------------------------|--------|------------------------------------|------|
| Volumetric calculations . . . | 1 :    | Computing percentages . . . . .    | 4    |
| Numerical calculations . . .  | 1 :    | Verifying records . . . . .        | 5    |
| Food and nonfood percentages. | 2 :    | Disposition of completed cards. .  | 5    |
| Recording contents on card    | :      | Re-examinations and changes on     |      |
| Form Bi-174 . . . . .         | 2 :    | cards . . . . .                    | 5    |
| Method . . . . .              | 2 :    | Storing examined material . . . .  | 5    |
| Food items . . . . .          | 2 :    | Material held out . . . . .        | 6    |
| Nonfood items . . . . .       | 3 :    | Records of examinations . . . . .  | 6    |
| Sample card . . . . .         | 4 :    | Records of incomplete data . . . . | 6    |

-----

VOLUMETRIC CALCULATIONS

When feasible, the volume of the food should be measured in cubic centimeters. The volumes of the crop and the stomach contents may be given separately, or, if combined, the proportion (percentage) that each constitutes of the whole should also be given. These figures should be recorded following the descriptive term used to designate the condition of the stomach and/or the gullet (or crop) and on the line immediately below. It is not necessary at that point to record the volume of each specific item. The food of gallinaceous birds, doves, and pigeons, and that of some of the waterfowl, often lends itself well to volumetric measurement. On the other hand, similar computation of the food of small insectivorous birds may be too difficult, in which case estimates only can be given.

NUMERICAL CALCULATIONS

Where possible, give the number of individuals of each species present in the stomach. When this is not feasible, an estimate may be made. When no numbers can be given, describe the condition of the material. In making estimates, it is customary to count the individuals present in a sample and then multiply this figure by the total number of like portions present in the entire volume.

## FOOD AND NONFOOD PERCENTAGES

Gravel, trap debris, internal parasites, and other nonfood material should not be included in the food percentages, but their relationship to the gross volume of the contents should be computed. The percentage contributed by any given item toward the total food should be based on volumetric calculations or on careful estimates of volume. It is well to avoid as much as possible the lumping of items under a single percentage. Such lumping complicates tabulating. The residual debris of the stomach contents, that is, that fraction of the contents that cannot be separated without undue expenditure of time and labor, should be allocated, as far as possible, to the items that are represented, or may be assumed to represent each, in due proportion. Such allocation can, of course, be based in most cases only on visual estimates or appraisal. Unless this is done, however, a large number of the record cards will show high percentages of miscellaneous debris. Items composing less than 1 percent of the food should be listed as a trace. All percentages on the stomach cards should be in whole numbers, although fractions of a percentage may be used in tabulating the average food percentages of a species.

### RECORDING CONTENTS ON CARD FORM BI-174

#### Method

The analysis record should be legibly written in carbon ink or typed with a black ribbon, and signed by the examiner. In many cases the original cards are photostated, and copies are furnished to persons requesting them. The cards should therefore be presentable. If the examiner's longhand is not clear, the cards should be printed. The examiner's name should, however, always be in longhand. Carbon ink should be used exclusively. If the record of the contents can be written in tabular form in one or two columns, it will facilitate indexing and tabulating. In using the back of the card, turn the card over from bottom to top and start writing, after inscribing the accession number.

#### Food Items

Some uniformity or standard in the arrangement of items on the cards should be maintained. This need not be an inflexible rule for the entire work of the laboratory, but a uniform method should be followed within any given series of stomachs. When only the stomach contents or a part thereof are received, such as is frequently the case with ruminants, this should be noted on the card. Animal items and plant items should always be grouped separately. Either may be listed first. A good practice to follow is to begin with the group that represents the major, or economically most important, food of the species concerned. There is no objection, however, to listing the animal items first.

It is urged that some methodical order be adhered to in entering items on the cards. Classes, orders, and families should be arranged either in phylogenetic sequence or in order of importance, and the genera and species

can be arranged thereunder in alphabetical order, in order of importance, or in scientific order. Undetermined and miscellaneous material should follow more fully determined items.

Always give the number, parts, and scientific name or description of the material present, as for example, 14 seeds of Setaria viridis, or, many fragments of the rootstock of undetermined plant. With fish-eating birds, the length and weight of fishes eaten often are desirable items of record. All generic and specific names should be underscored. Other scientific names are not underscored. If the scientific name is likely not to be recognized by indexers, record the common name or order in parentheses following or preceding the scientific name. The percentage figure, set off by a comma, should follow the scientific name or the common name. A semicolon should follow the percentage figure or the designation "trace". A colon should be used to separate animal and plant groupings. On crowded cards, the underscoring of percentage designations in red will aid in subsequent computations.

#### Nonfood Items

Gravel, when present, should be given a percentage based on its ratio to the total stomach contents. It should not be included with the food percentage, but should be segregated together with other nonfood items before the food percentages are estimated.

Nonfood items, other than grit, as parasites, secondary food material, trap debris, and accidental items, should be recorded separately at the end of the food items. These usually should be assigned a percentage based upon relationship to the total contents, but should not be included in the food percentages.



# Sample Card

An example of a well-written card follows:

|  |   |                               |
|--|---|-------------------------------|
| NAME: <u>Bonasa umbellus</u>   | SEX: <u>Male</u>                        | NUMBER: <u>217313</u>         |
| LOCALITY: <u>Shenandoah Co., Va.</u>   | WHERE KILLED: <u>Laurel thicket</u>     |                               |
| DATE: <u>Nov. 15, 1937.</u> HOUR: <u>10 a.m.</u>   |   | COLLECTOR: <u>T. E. Clark</u> |
| COLLECTOR'S NO.: <u>93</u>   |   |                               |
|  |   |                               |
| CONDITION OF STOMACH: <u>Full -</u>  | CONDITION OF GULLET: <u>Nearly</u>      |                               |
| <u>92 percent of gross food.</u>   | <u>empty - 8 percent of gross food.</u> |                               |
| VOLUME OF TOTAL FOOD: <u>6.50 cc</u>   |   |                               |
| PERCENTAGE OF ANIMAL MATTER: <u>0</u> ; OF VEGETABLE, <u>100</u> ; OF GRAVEL, <u>0</u> ; |   |                               |
| <u>Contents</u>  | <u>Stomach</u>                          | <u>Crop</u>                   |
|  | <u>Percent</u>                          | <u>Percent</u>                |
| 22 <u>Cornus florida</u> stones (gizzard, 18) ..   | 51                                      | 20                            |
| 14 <u>Crataegus</u> sp. stones or nutlets .....  | 14                                      | ---                           |
| 15 <u>Gaultheria procumbens</u> seeds .....  | tr.                                     | ---                           |
| <u>Geum</u> sp. ....   | ---                                     | 20                            |
| 3 <u>Hamamelis virginiana</u> seeds .....  | ---                                     | 20                            |
| <u>Kalmia latifolia</u> buds and twigs .....   | 3                                       | ---                           |
| 4 <u>Lespedeza</u> sp. seeds .....   | tr.                                     | ---                           |
| <u>Menziesia pilosa</u> buds and twigs .....   | tr.                                     | ---                           |
| 19 <u>Rosa</u> sp. achenes (gizzard, 16) .....   | 5                                       | 40                            |
| <u>Rumex acetosella</u> .....  | 7                                       | ---                           |
| 1 <u>Smilax</u> seed .....   | tr.                                     | ---                           |
| <u>Vaccinium</u> sp. buds and twigs .....  | 3                                       | ---                           |
| 3 <u>Viburnum</u> sp. stones .....   | tr.                                     | ---                           |
| 1 <u>Vitis</u> sp. fruit .....   | ---                                     | tr.                           |
| Undetermined plant material .....  | 17                                      | ---                           |
| EXAMINATION MADE BY: <u>R. H. Gensch.</u>  | DATE: <u>April 1938.</u>                |                               |

## COMPUTING PERCENTAGES

Percentages are based on volumetric measurements. The volume of the crop and stomach contents should, if possible, be measured and computed in cubic centimeters. The relative percentages of the crop and the stomach contents in terms of the whole food also should be noted on the examination card, as, for instance, "Condition of crop, full = 92 percent; condition of stomach, nearly empty = 8 percent".

The total percentages of the items in the crop and the stomach should aggregate 100 percent. To compute percentages of the several items in relation to the total food, or, in other words, to combine the percentages of crop and stomach, proceed as follows: Multiply the percentage of each crop item by the percentage representing the gross crop contents and to this add the figure similarly computed with respect to the same item in the stomach, if it also appears there. For instance, if the crop contents equal 92 percent, and that of the stomach 8 percent, of the gross food, the percentage for item A, which composes 50 percent of the crop and 25 percent of the stomach contents, should be computed thus: 50 percent x 92 percent, plus 25 percent x 8 percent, equals 48 percent. If an item appears only in the crop or in the stomach, the process is the same except that there will be no adding of percentages. All cards should clearly indicate what the various figures signify.

#### VERIFYING RECORDS

The data on the cards should be proof-read with the original stomach schedules. Any corrections found necessary should be made also in the accession catalog and on the label accompanying the examined stomach.

Verify the spelling of food items on stomach cards and see that the analyses are intelligible before handing them in. The percentages should be checked to see that the totals for animal and plant items agree with those given at the top of the card, and that all food percentages combined add to 100.

#### DISPOSITION OF COMPLETED CARDS

When special examinations are completed, the stomach cards together with the orange assignment card should be sent to the official having charge of such assignments. After the material has been typed or photostated and a copy transmitted to the cooperator, the original cards should go to the file clerk. After they have been indexed, they are incorporated into the permanent files. Cards of regular examinations should be given directly to the file clerk at the end of each month or other regular period.

#### RE-EXAMINATIONS AND CHANGES ON CARDS

If any material is re-examined and changes are made on the stomach cards that have already been indexed, it will be necessary to make corresponding changes on the two index cards covering each item concerned. These corrected stomach cards should, therefore, be turned over to the file clerk for re-indexing and should not be put back in the stomach file until they have been re-indexed. If tabulation sheets have been prepared, a change should be made in them if necessary to insure accuracy.

#### STORING EXAMINED MATERIAL

After examination, the stomach contents should be thoroughly dried and placed in glass or cardboard vials together with the original stomach tag. The vials should then be stoppered with cotton, and the cardboard

vials covered with glued-on tops. The food material of the crop and of the gizzard should be placed in the same container; these may be separated, however, in the vial by tissue paper or a cardboard disc. Use the smallest vial possible. Do not waste space. The cardboard vials should be used only when the stomach contents are neither greasy nor oily. In storing stomach contents large in volume (as those of fish-eating birds, ruminants, and the larger predators) diagnostic samples only need be saved, but a note showing what part of the material has been saved should be entered on the examination card. Essential data, including the permanent accession number, should be written on the storage vials. The date of examination and the name of the examiner should also be included in the legend. This information is used in the system of filing away examined material.

All examined material should be assembled at the end of each month, sorted out by species, bundled into convenient packets (bound and tied with strong cord), and labeled to show the species, the examiner's name, month in which examined, and the accession numbers (inclusive) of the stomachs. The material should then be turned over to a laboratory assistant for proper filing.

#### Material Held Out

If any food material is held out for identification or for the reference collections, the number of individuals or the quantity withheld should be noted on the card. Write plainly the accession number of the stomach on the label of each vial containing any item that is removed. If material is to be sent to a specialist, record the essential data concerning the specimen on printed labels provided for that purpose. If more than one item is involved, symbols may be used on cards and vials to represent the items. When material is returned properly identified, the entries should be made on the card. The material should then be returned to the stomach vial. To facilitate this, the examined stomachs should be kept by the examiner (except when a long delay is expected) until the withheld material is returned to the vials.

#### RECORDS OF EXAMINATIONS

Each examiner should keep a record of the stomachs examined, and should report each month, on special forms provided for the purpose, the number of stomachs of each species examined, and if it was a special cooperative investigation, the name of the person or organization for whom the examination was made.

#### RECORDS OF INCOMPLETE DATA

If stomachs are missing or empty, the fact should be noted on the schedules and in the accession catalog, with the date and the examiner's initials. Similar information should be turned in also with reports on special examinations; the unused stomach cards, marked "empty" or "missing", will suffice.